

Antibiotic Prophylaxis in Second Trimester Amniocentesis: Is it Necessary?

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Antibiotic Prophylaxis in Amniocentesis

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Abstract

Aim: Amniocentesis is an invasive diagnostic procedure performed under ultrasonographic guidance. With this procedure amniotic fluid is sampled from the pregnant uterus by a needle puncture through the overlying skin into the uterus and amniotic cavity. In the present prospective randomized multi-centered case controlled study we aim to compare the efficacy of antibiotic prophylaxis in preventing fetal loss during amniocentesis in 564 pregnancies.

Material and Method: 564 singleton pregnancies between 16 and 18 weeks' gestation admitted to our prenatal unit for amniocentesis between June 2011-July 2012 were included. Ampicillin (1g) was administered to 300 patients (that were odd numbered) upon admittance while the remaining 264 (that were even numbered) did not receive any prophylaxis.

Results: The rate of fetal loss between patients who received ampicillin (0.33%) and who did not (0.37%) was similar (p:0.87).

Discussion: As maternal mortality and morbidity after amniocentesis is very low (less than 1/1000) antibiotic prophylaxis is usually not recommended. Gramellini et al. reported that antibiotic prophylaxis actually made no difference in post procedural abortion rates and our results were in line with these. However multi-center studies with larger groups are warranted.

Keywords

Amniocentesis; Antibiotic; Prophylaxis; Fetal Loss; Perinatology

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Introduction

Amniocentesis is an invasive diagnostic procedure performed via transabdominal approach preferably under ultrasonographic (USG) guidance. With this procedure amniotic fluid is sampled from the pregnant uterus by a needle puncture through the overlying skin into the uterus and amniotic cavity [1]. It is generally performed around 16th week of gestation and according to current literature, second trimester amniocentesis is the most common invasive prenatal diagnostic procedure [2]. This method was first performed as a therapeutic procedure in the 1950s for measurement of bilirubin concentration and prediction of the severity of Rhesus immunisation. Amniocentesis is a decisive diagnostic method for prenatal detection of chromosomal and metabolic disorders allowing health professionals to inform and guide parents on making important decisions about early treatment options or prenatal interventions [1].

Even though the technique had stayed simple, the use of amniocentesis has dramatically increased in time and although relatively safe, there is a slight chance (1/200) of fetal loss after the procedure. Complications associated with second trimester amniocentesis can be listed as; Leakage of amniotic fluid, infection, pregnancy loss, rectus sheath hematoma and fetal injury, as reported in a retrospective survey of 358 consecutive amniocentesis cases [Pergament, 2000]. However amniocentesis is generally not associated with severe pregnancy complications such as a placental abruption [2-3].

Despite partial interaction of the cervical epithelium, placental membranes, and cellular components of the placenta, the amniotic cavity is usually regarded as a sterile environment [4]. The risk of morbidity and mortality for the mother is considered to be minimal and if amniocentesis is performed appropriately, it is extremely rare to get an intraamniotic infection [0.42%][5-6]. The risk of chorioamnionitis after amniocentesis is less than 0.1% and the risk of a severe maternal infection is between 0.03% and 0.09% [2]. The incidence of invasion by microorganisms during amniocentesis performed in the second trimester is reported to be between 1% and 8% [6-7].

In the present investigation we aim to compare the efficacy of antibiotic prophylaxis in preventing intra-amniotic infection and possibly fetal loss during amniocentesis in 564 pregnancies in a prospective randomized multi-centered case controlled study.

Material and Methods

The study was subject to ethics committee approval of the institution within which the work was undertaken. Five hundred and sixty-four singleton pregnancies between 16 and 18 weeks who were admitted to our prenatal unit for amniocentesis between June 2011 to July 2012 were included in the study group. All women were required to fill and sign a specific informed consent form detailing the procedure and the risks involved.

All data were recorded in specific study forms and computer assigned randomization depending on odd/even number sequence for receiving or omitting antibiotic prophylaxis at admittance was performed.

Amniocentesis was performed by a single obstetrician with the help of a nurse and a resident using a 22-Gauge spinal needle under trans abdominal ultrasonographic guidance.

Ampicillin (1g) orally was administered at admittance to 300 women (odd numbered) while the remaining 264 (even numbered) did not receive any prophylaxis.

Anti-D immunoglobuline (300 mcg i.m.) was administered to patients with Rh-incompatibility.

All women were reevaluated for any complications with USG immediately and 1 week after the procedure and were followed regularly until delivery.

Mann Whitney U test was used for comparisons. A probability (P) value lower than 0.05 was considered statistically significant.

Results

The rate of fetal loss between pregnancies that received ampicillin prophylaxis (Group A)(0.33%) and control (Group B)(0.37%) was similar (Table 1).

Live birth rates across the groups (99.66% vs.99.61%) did not differ (Table 1).

One woman from each group had post procedural intra amniotic infection resulting in anhydramnios and ultimately fetal loss. There was no maternal mortality.

Two fetuses from group A and one fetus from group B had major chromosomal abnormality, ending in termination.

The rate of chromosomal anomaly between the groups was not compared and the number of pregnancies with chromosomal anomalies were omitted for the comparison of live births.

Table 1. **Mann-Whitney U Test comparing the data between the groups which received or not received antibiotic prophylaxis

[n=564]	Group A Ampicillin [n=300]	Group B No ampicillin [n=264]	P
Fetal Loss	1 [0.33%]	1 [0.37%]	0.87**
Live Births	297 [99.66%]	262 [99.61%]	0.89**
Chromosomal Abnormality	2 [0.66%]	1 [0.37%]	0.6**
Mann Whitney U test			** p>0.05

Discussion

Due to the fact that maternal mortality and morbidity, including fatal septic shock, reported for amniocentesis is very low (less than 1/100)) antibiotic prophylaxis is usually not recommended [2].

On the other hand some authors suggest that maternal mortality and morbidity rates after amniocentesis are actually higher than reported and it is possible that this difference between reported rates of fetal loss could arise from the range of factors that might otherwise predispose patients to amniocentesis-induced pregnancy loss [8-9].

Therefore, in light of these discussions some centers in Italy started routine antibiotic prophylaxis in second trimester amniocentesis, depending on the results from a large study reported by Giorlandino et al. and others that reported, antibiotic prophylaxis to reduce the risk of fetal loss and rupture of the membranes [4-10].

However not all studies have confirmed such association. In another study from Italy which compares amoxicillin prophylaxis in amniocentesis, Gramellini et al. reported that antibiotic prophylaxis actually made no difference in post procedural abortion rates [11].

Our results were also in correlation with Gramellini's study, meaning we found no, statistically significant, difference by using antibiotic prophylaxis in amniocentesis for prevention of post procedural fetal loss. Hence factors known to be possibly responsible of amniocentesis-induced pregnancy loss, such as infection, maternal age, operator skill,

bleeding, and a history of second-trimester abortion, it is very important to comprehend not only how these factors come into effect, but also how they can be neutralized. Moreover, antibiotic usage has its own risks, including (but not limited to) an increased resistance among known pathogenic microorganisms and a notable increase in financial costs. Hence it may be logical to administer antibiotic prophylaxis to women with certain risk factors or not at all [4-10-11].

Finally in terms of prophylaxis we can conclude that there is still not enough evidence to suggest routine use of antibiotics in amniocentesis to prevent post procedural fetal losses or any maternal mortality or morbidity.

Nevertheless it is also clear that more studies based on different centers and with larger groups would be required for definite conclusions.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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